The Art of Composting for LEAs

Composting Technical Guidance for Local Enforcement Agency to Improve Effectiveness

Composting Defined (Regulatory)

"Active Compost" " means compost feedstock that is in the process of being rapidly decomposed and is unstable. Active compost is generating temperatures of at least 50 degrees Celsius (122 degrees Fahrenheit) during decomposition; or is releasing carbon dioxide at a rate of at least 15 milligrams per gram of compost per day, or the equivalent of oxygen uptake. conditions.

Composts Happens ...

Any accumulation of compostable material will start to decay with or without purposeful management.

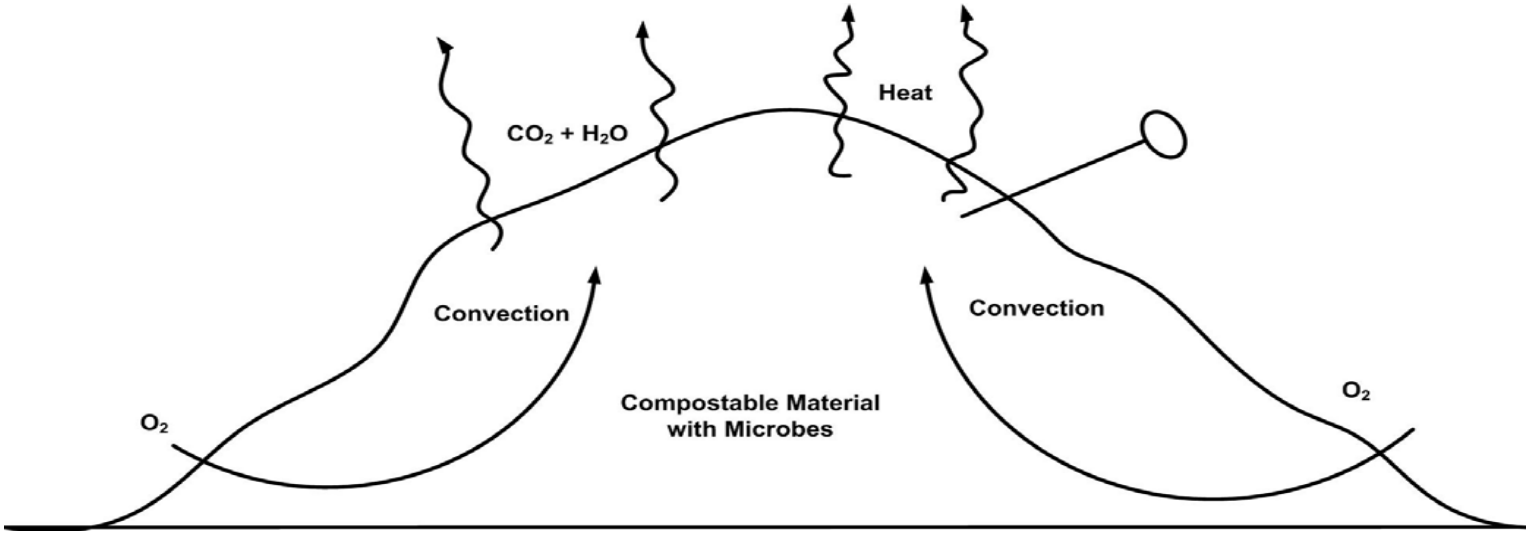
Composting Transforms ....

Almost every organic material can be composted.

Composting Defined (Non-Regulatory)

Composting: A process of biological and chemical transformation of organic matter toward more decay-resistant components under predominantly aerobic conditions.

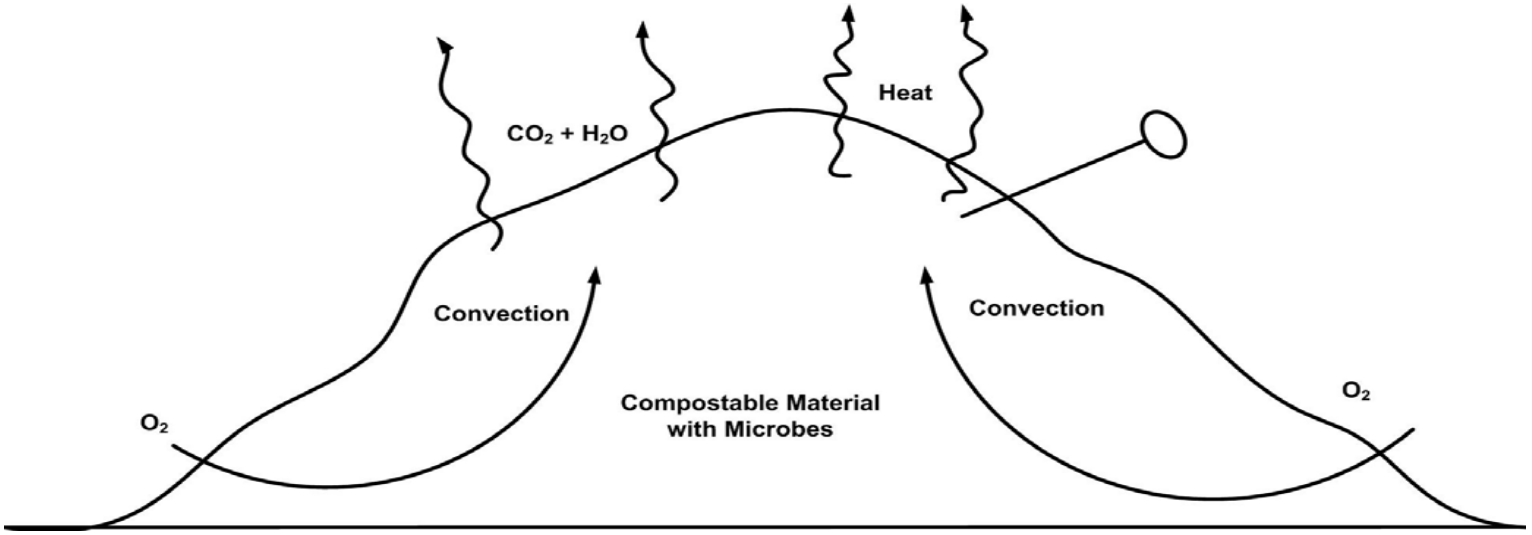
What's Happening in Composting



A Balanced Equation:

$$C_xH_yO_zN_?S_?P_?K_?... + H_2O + O_2 \rightarrow CO_2 + H_2O + \Delta T + \Delta LIFE + ?\uparrow$$

What Can Go Awry in Composting



An Out-Of-Balance Equation?

$$C_xH_yO_zN_?S_?P_?K_?... + H_2O + O_2 \rightarrow CO_2 + H_2O + \Delta T + \Delta LIFE + ?\uparrow$$

(feedstock mix) (moisture)(aeration) (temperature) (odors)

Composting and Moisture

Optimal Moisture Content Range: 40-60%

Moisture Distribution is Key

"Cellular" and "Particle-Coating" are Best

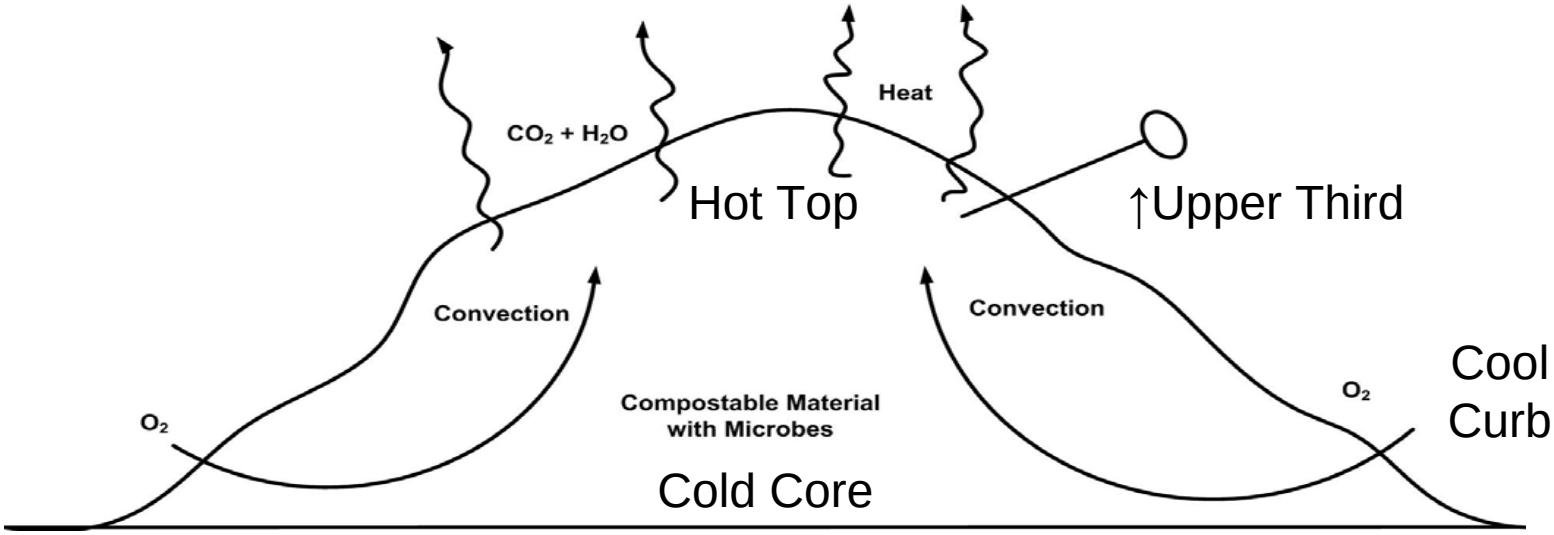
Composting and Temperature

Optimal Temperature Range: 125°-160°F

Rate of Temperature Rise is Important

When, How, Where to Measure?

Composting and Temperature



Optimal Temperature Taking Location: **Upper Third of the Pile**

Composting and Temperature

How Hot Is Too Hot: 160°-200°F

Depends on the Material

What's the process, and where in it?

Composting and Temperature

How Hot Is Too Hot: ›200°F

Product, Access, Fire Concerns

Heterogeneous versus Homogeneous?

Composting and Fire

How Hot Is Too Hot: **Fire Concerns**

Heterogeneous? ›175°F

Homogeneous? ›200°F

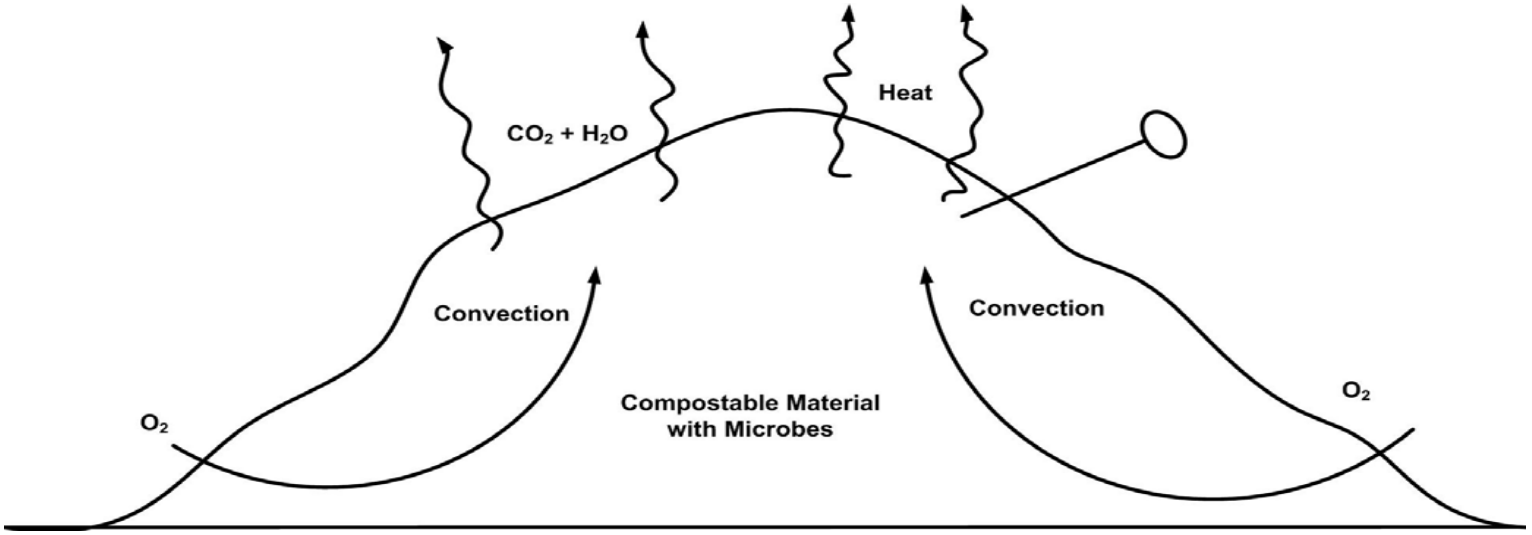
Composting and Agitation

Optimal Agitation or "Turning" Rate?

Depends on Process

Purpose: Porosity, Homogeneity

Does the Recipe Work?



Look to the Balanced Equation:

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(feedstock decomposition) **(temperature) (odors)**

Composting Rates Depend on the Mixture of Materials

Fast/Hot ..... Moist Grass Clippings, Kitchen Wastes with Shaved Wood

Medium/Warm ....Whole Weeds, Chipped Vernal Tree Trimmings

Slow/Cool ..... Dry Leaves/ Branches, Autumn Tree Trimmings, Shredded Paper, Dry Chipped Wood

Composting Recipes

1/3 chickens,
1/3 fresh litter,
1/3 wood chips,
…

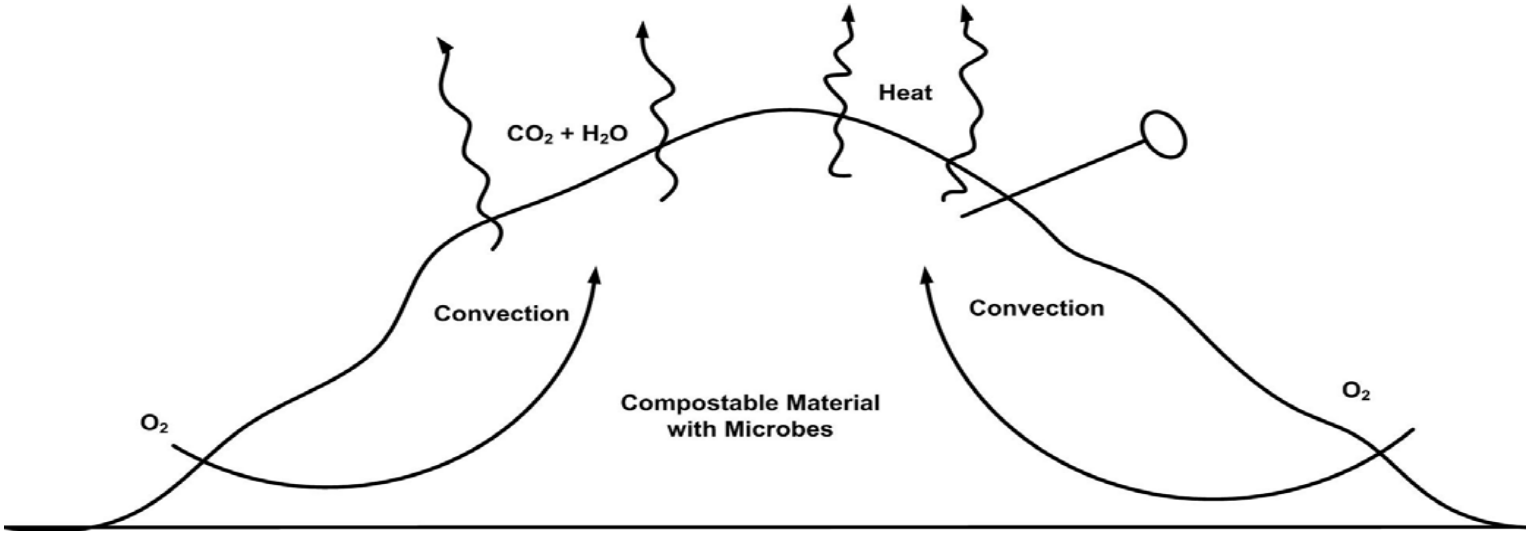
Wet Grass, Shredded Paper,
Kitchen Scraps, Sawdust, …

Green material with
dry leaves and brush,
spent stable bedding,
coffee grounds, …

Grape pomace, wort solids,
chipped tree trimmings, poultry litter,

1) Abundantly available materials
2) Add "balancing" materials to increase porosity or loft, raise or lower moisture content,
3) If dry, "coat" feedstock particles sparingly with water and thoroughly distribute by turning.

How Do We Know? Examples



Again, Look to the Balanced Equation:

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(And maybe try it yourself!)

Small Composting Systems – 3 Bin

Classic Large Garden Design
Advantages: Simple, Multi-user friendly, Flexible feeding rates
Disadvantages: Requires fair amount of space, May be difficult to "turn"

Small Composting Systems – 1 Bin

Advantages: Simple, Small "footprint"
Disadvantages: Challenges achieving temperatures, harvesting "finished" compost , and "turning"

Small Composting Systems – 2 Bin

A Compromise
Advantages: Flexible, Simple
Disadvantages: Still requires fair amount of space, Some "Turning" challenges

Composting Systems – The Watson Way

Phase A: Thermophilic Goal
Weed and odor control, Vector deterrent
Builds the "Compost Matrix"
(Lasts about 6-9 months)

Composting Systems – The Watson Way

Phase B: Vermi-Composting
Food Scraps plus Carbon Sources
And those Worms yields "Black Gold"
(Up to 18 months including curing)

Composting - Getting Started

Home (Backyard) Composting Tips:

✓Start small, and with limited inputs

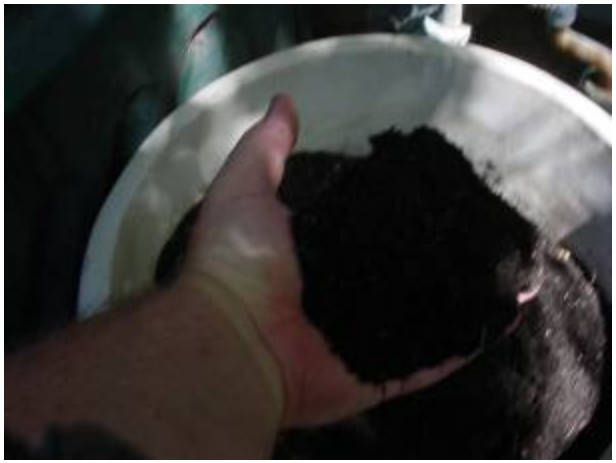
✓ Add on slowly, amount/feedstock

✓ Make it easy, fun, useful

Composting - Getting Started

"The best composters in California are ***connected*** to their product."

Composting and Connection



"Being physically anchored to the earth helps to keep my ego from bobbing along mindlessly on the sea of life." Huston Smith, from *Making Perfect Dirt*